

DRYOPOID BEETLES OF THE SOUTH FORK OF THE
SHENANDOAH RIVER BASIN, VIRGINIA, WITH
SOME BIOLOGICAL NOTES

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ABSTRACT

Between 1975 and 1978, 15 dryopoid species in 4 families were collected in the South Fork of the Shenandoah River Basin. The most abundant species were *Stenelmis crenata*, *S. mera*, *Optioservus trivittatus*, and *Psephenus herricki*. Of the 11 remaining species, 7 were common and 4 were rare. Seven species were collected at light traps from late June to mid-September. *Dubiraphia minima* larvae and *S. markeli* adults were most abundant in pools, *S. sandersoni* and *Ancyronyx variegata* were found only in small to large streams, and *S. markeli* was found only in the large river habitat.

Dryopoid beetles are important in the structure and function of running waters, especially the riffle habitat, because of their abundance, diversity, and role in the benthic community (Finni and Skinner 1975). A benthic survey in 1975-1976 showed the dryopoids to be abundant and diverse in the South Fork of the Shenandoah River Basin (Seagle and Hendricks 1978). Ten species were reported and the dryopoid fauna averaged 20% of the benthic community. Previous surveys conducted in the basin listed only 7 genera, with no species identification (Tackett 1963; Surber 1965; Surber 1966; Benfield *et al.* 1972).

The general distributions of many dryopoids are rather well known (Brown 1972). However, few studies (except Finni and Skinner 1975; Huggins *et al.* 1976; Brown and Huggins 1977; Finni *et al.* 1978) have dealt with dryopoid distributions on a regional level. With more attention being focused on dryopoids as indicators of water quality, it is becoming more important to know the distribution and abundance of this group within drainage basins. This paper presents knowledge gathered over the 4 year period from 1975 to 1978 on the dryopoids present and their relative abundance in the South Fork of the Shenandoah River Basin.

BASIN DESCRIPTION

The South Fork of the Shenandoah River drains 4144 km² of the Appalachian mountains and valleys of northwestern Virginia (Fig. 1). The South Fork of the Shenandoah River receives three major tributaries, the North, Middle, and South Rivers. The North and Middle Rivers arise in the Allegheny Mountains to the west and South River arises in the Blue Ridge Mountains to the east. The three tributaries converge at Port Republic, Virginia, to form the South Fork. The South Fork meanders 100 miles through the Shenandoah Valley to Front Royal, Virginia, where it meets the North Fork to form the Shenandoah River proper.

Table 1. The dryopoid families and species collected in the South Fork of the Shenandoah River Basin with distribution and abundance. Abundance was based on a 1975-1976 survey in which 265 samples were analyzed.

Species	Distribution		Abundance*
	Upper Basin	Lower Basin	
Elmidae			
<u>Stenelmis crenata</u> (Say)	X	X	A
<u>S. mera</u> Sanderson	X	X	A
<u>S. markeli</u> Motschulsky		X	C
<u>S. musgravei</u> Sanderson		X	R
<u>S. sandersoni</u> Musgrave	X		C
<u>Optioservus trivittatus</u> (Brown)	X	X	A
<u>Ancyronyx variegata</u> (Germar)	X		R
<u>Dubiraphia minima</u> Hilsenhoff	X	X	C
<u>Macronychus glabratus</u> Say	X	X	C
<u>Microcylloepus pusillus aptus</u> (Musgrave)	X	X	C
<u>Promoresia elegans</u> (LeConte)	X	X	C
Psephenidae			
<u>Ectopria nervosa</u> (Melsheimer)	X	X	R
<u>Psephenus herricki</u> (DeKay)	X	X	A
Dryopidae			
<u>Helichus lithophilus</u> (Germar)	X	X	C
Limnichidae			
<u>Lutrochus laticeps</u> Casey	X	X	R

*Abundant (A) = >1000 collected; Common (C) = 25 - 1000 collected; Rare (R) = <25 collected.

METHODS

Four types of samples were taken: 1, kick samples with a D-frame aquatic net; 2, Portable Invertebrate Box samples (Ellis-Rutter Associates); 3, hand collecting; 4, light trap samples using both ultraviolet and visible light. Most benthic samples were taken in riffles but many were taken in pools and slow water areas.

RESULTS AND DISCUSSION

Of the 6 aquatic dryopoid families, 4 were represented in the South Fork of the Shenandoah River Basin (Table 1). The family Elmidae was represented by 11 species, Psephenidae by 2 species, and Dryopidae and Limnichidae by 1 species each. Samples of 15 species were collected.

The most abundant species in the basin was *Stenelmis crenata*. The other

abundant species were *Optioservus trivittatus*, *S. mera*, and *Psephenus hericki*. Several species were very rare in the basin. Only 2 larval specimens each of *Ectopria nervosa* and *Lutrochus laticeps* were collected over the 4 year period. Both species are terrestrial as adults and seldom occur in benthic samples. Twelve *Ancyronyx variegata* were collected, 2 adults and 10 larvae.

Light trap samples were taken periodically at Middle River and South Fork at Front Royal through the summer of 1978. Adults began to fly in late June and were collected up to mid-September. Seven species were caught at the light trap; *S. mera* was the most abundant, and the others were *S. crenata*, *S. markeli*, *S. musgravei*, *S. sandersoni*, *L. laticeps*, and *Helichus lithophilus*. Light trapping indicated that *L. laticeps* was more prevalent than originally thought, with 67 specimens collected.

Several species appeared to be restricted to either the upper or lower portion of the basin. Numerous samples in the upper portion of the basin (Middle River or North River) yielded only a few *S. sandersoni* with none

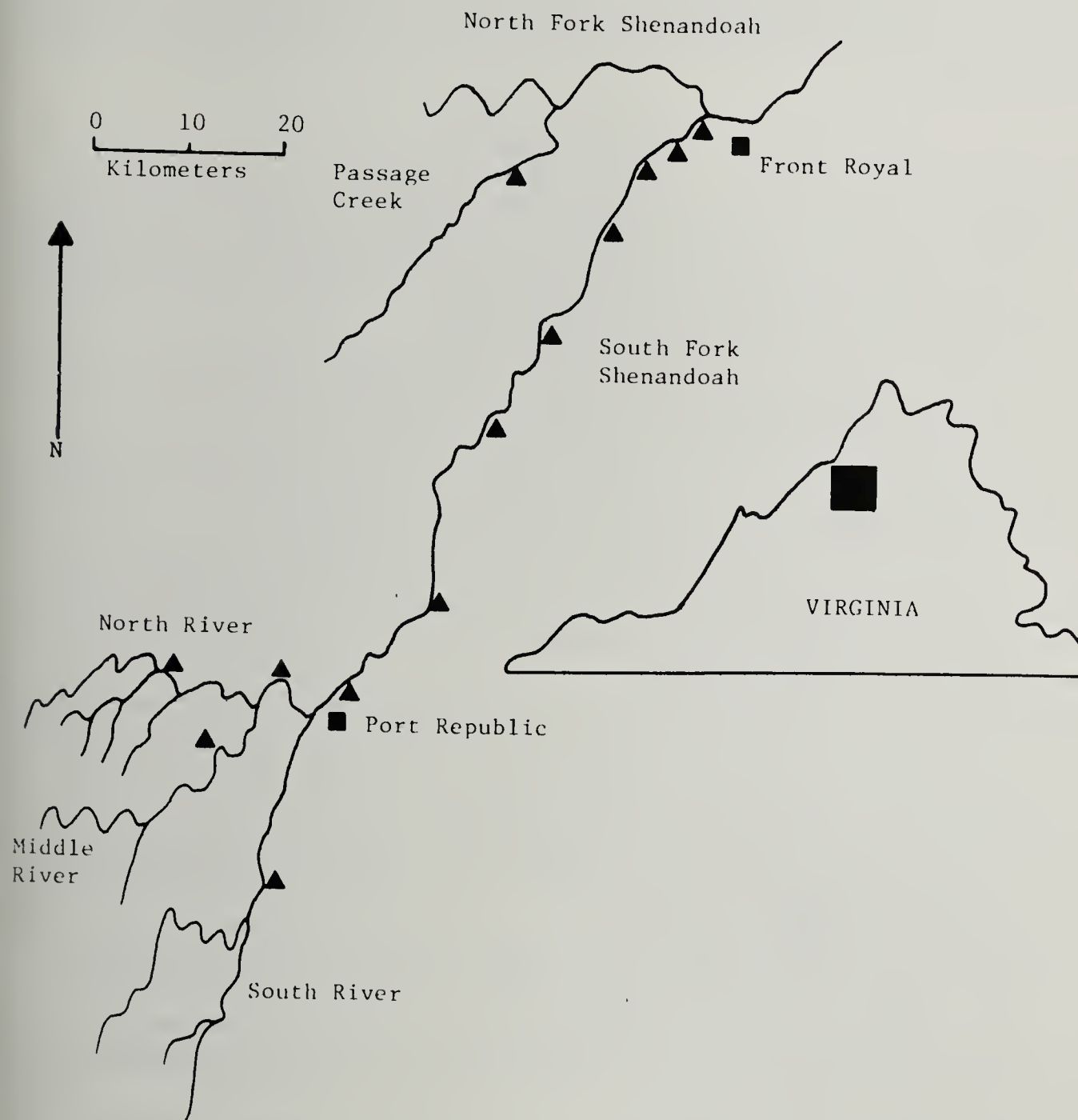


Fig. 1, Sampling stations in the South Fork of the Shenandoah River Basin, Virginia. Darkened triangles indicate sampling sites.

being collected in the lower portion. In the fall of 1977 three kick samples were taken from Passage Creek, a small shaded stream on top of the Massanutten Mountains. In these samples *S. sandersoni* was the dominant species, indicating its preference for smaller streams. *A. variegata* was collected at Middle River, but nowhere else in the basin. *S. markeli* and *S. musgravei* were collected only at the lower stations around Front Royal, where *S. markeli* appeared to be more successful in a large river habitat.

Despite being known as riffle beetles, some species, e.g. *Dubiraphia minima*, are known to occur in lakes and pools in streams (Brown 1972). Two species in this investigation showed a preference for stream pools. *D. minima* was never collected in high numbers in riffles. However, pool samples taken at Middle River yielded > 200 larvae per 0.1m^2 . At Front Royal, *S. markeli* adults were occasionally collected in riffles. When pool samples were taken the species began to turn up in increasing numbers.

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